

MOS FET Relay

G3VM-  
XN(F)/4N(F)

SSR for Switching Analog Signals, with  
an I/O Dielectric Strength of 2.5 kVAC  
Using Optical Isolation

- Switches minute analog signals.
- Linear voltage and current characteristics.
- Switches AC and DC.
- Low ON-resistance.
- Current leakage less than 1 μA between output terminals when they are open.
- Surface-mounting models also available.
- UL/CSA approval pending.



Ordering Information

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Taping quantity
SPST-NO	PCB terminals	60 VAC	G3VM-XN	50	---
		400 VAC	G3VM-4N		
	Surface-mounting terminals	60 VAC	G3VM-XNF		
		400 VAC	G3VM-4NF		

Model Number Legend:

G3VM-

1 2

1. Load Voltage

- XN: A load voltage of 60 VDC or 60 VAC (peak value)  
4N: A load voltage of 400 VDC or 400 VAC (peak value)

2. Terminal

- None: PCB terminals  
F: Surface-mounting terminals

Application Examples

- Electronic automatic exchange systems
- Measurement control systems
- Data gathering systems
- Measuring systems

## Specifications

### ■ Absolute Maximum Ratings (Ta = 25°C)

Item				G3VM-XN(F)	G3VM-4N(F)	Conditions	
Input	LED forward current		I <sub>F</sub>	30 mA		---	
	Repetitive peak LED forward current		I <sub>FP</sub>	1 A		100-μs pulses, 100 pps	
	LED reverse voltage		V <sub>R</sub>	5 V		---	
Output	Output dielectric strength (load voltage)		V <sub>BO</sub>	−60 to 60 V	−400 to 400 V	DC or AC peak value	
				0 to 60 V	0 to 400 V	DC	
	Continuous load current (see note 1)	A connection	I <sub>O</sub>	300 mA	150 mA	---	
				B connection	450 mA		200 mA
				C connection	600 mA		300 mA
Dielectric strength between I/O terminals (see note 2)			V <sub>I-O</sub>	2,500 V AC		1 min	
Ambient temperature			T <sub>a</sub>	−20 to 85°C		With no icing or condensation	
Storage temperature			T <sub>stg</sub>	−55 to 100°C		With no icing or condensation	
Max. soldering temperature and time			---	260°C		10 s	

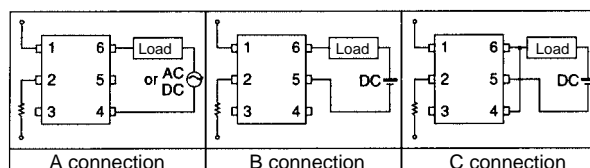
**Note:** 1. The load current attenuation rates for the different types of connection are as follows:

G3VM-XN(F): A: –3.0 mA/°C; B: –4.5 mA/°C; C: –6.0 mA/°C

G3VM-4N(F): A: –1.5 mA/°C; B: –2.0 mA/°C; C: –3.0 mA/°C

2. The dielectric strength between I/O terminals was measured with voltage applied to all of the LED pins and with voltage applied to all of the light-receiving parts respectively.

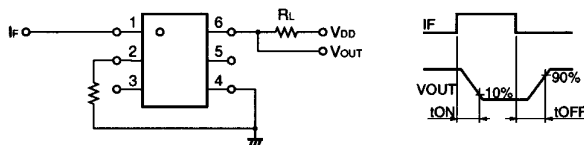
### Connection Circuit Diagram



### ■ Electrical Performance (Ta = 25°C)

Item			G3VM-XN(F)	G3VM-4N(F)	Unit	Conditions
Input	LED forward current	V <sub>F</sub>	1.2 V min, 1.7 V max.		V	I <sub>F</sub> = 10 mA
	Trigger LED forward current	I <sub>FT</sub>	5 mA max.			I <sub>O</sub> = 300 mA (G3VM-XN(F)) I <sub>O</sub> = 150 mA (G3VM-4N(F))
Output	Output ON resistance	A connection	2 Ω max.	12 Ω max.	Ω	I <sub>F</sub> = 10 mA I <sub>O</sub> = MAX
		B connection	1 Ω max.	6 Ω max.		
		C connection	0.5 Ω max.	3 Ω max.		
	Switching current leakage	I <sub>LEAK</sub>	1.0 μA max.		μA	V <sub>off</sub> = 60 V (G3VM-XN(F)) V <sub>off</sub> = 400 V (G3VM-4N(F))
Operate time		T <sub>ON</sub>	0.5 ms max.	1.0 ms max.	ms	R <sub>L</sub> = 200 Ω (see note)
Release time		T <sub>OFF</sub>	0.5 ms max.	1.0 ms max.	ms	V <sub>DD</sub> = 20 V, I <sub>F</sub> = 10 mA
Floating capacity between I/O terminals		C <sub>I-O</sub>	0.8 pF, TYP		pF	f = 1 MHz

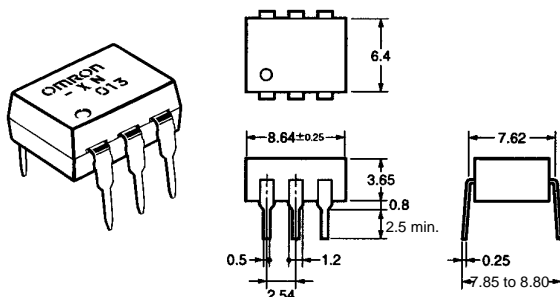
**Note:** The operate and release time were measured in the way shown below.



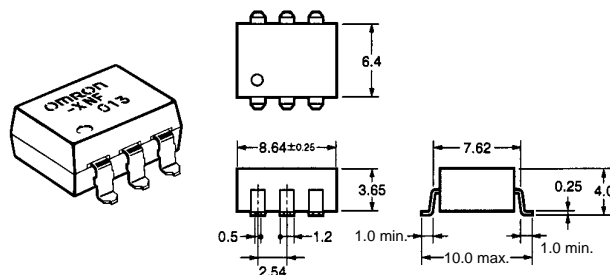
## Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

**G3VM-XN  
G3VM-4N**



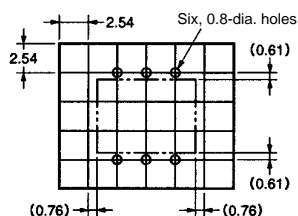
**G3VM-XNF  
G3VM-4NF**



**Note:** "G3VM" is not printed on the actual product.

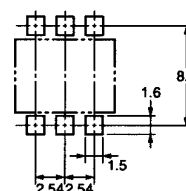
### ■ PCB Dimensions (Bottom View)

**G3VM-XN  
G3VM-4N**



### ■ Actual Mounting Pad Dimensions (Recommended Value, Top View)

**G3VM-XNF  
G3VM-4NF**

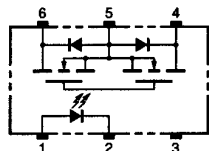


**Note:** Mounting pad dimensions shown are a top view.

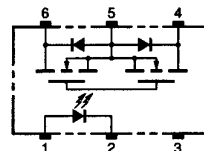
## Installation

### ■ Terminal Arrangement/Internal Connection (Top View)

**G3VM-XN  
G3VM-4N**



**G3VM-XNF  
G3VM-4NF**



## Precautions

**! WARNING**

Be sure to turn OFF the power when wiring the Relay, otherwise an electric shock may be received.

**! WARNING**

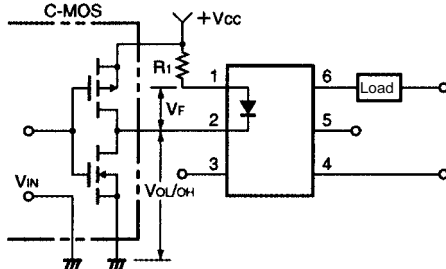
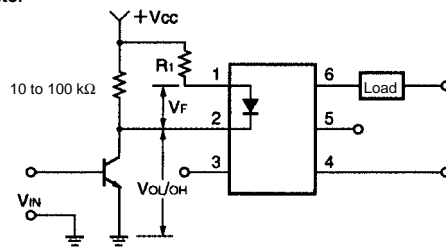
Do not touch the charged terminals of the SSR, otherwise an electric shock may be received.

**! Caution**

Do not apply overvoltage or overcurrent to the I/O circuits of the SSR, otherwise the SSR may malfunction or burn.

**! Caution**

Be sure to wire and solder the Relay under the proper soldering conditions, otherwise the Relay in operation may generate excessive heat and the Relay may burn.

**Typical Relay Driving Circuit Examples****C-MOS****Transistor**

Use the following formula to obtain the LED current limiting resistance value to assure that the relay operates accurately.

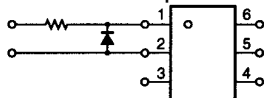
$$R_1 = \frac{V_{CC} - V_{OL} - V_F \text{ (ON)}}{5 \text{ to } 20 \text{ mA}}$$

Use the following formula to obtain the LED forward voltage value to assure that the relay releases accurately.

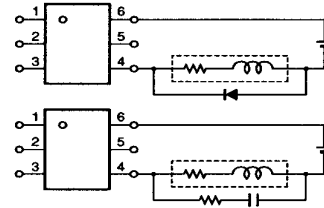
$$V_F \text{ (OFF)} = V_{CC} - V_{OH} < 0.8 \text{ V}$$

**Protection from Surge Voltage on the Input Terminals**

If any reversed surge voltage is imposed on the input terminals, insert a diode in parallel to the input terminals as shown in the following circuit diagram and do not impose a reversed voltage value of 3 V or more.

**Surge Voltage Protection Circuit Example****Protection from Spike Voltage on the Output Terminals**

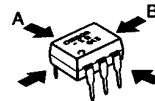
If a spike voltage exceeding the absolute maximum rated value is generated between the output terminals, insert a C-R snubber or clamping diode in parallel to the load as shown in the following circuit diagram to limit the spike voltage.

**Spike Voltage Protection Circuit Example****Unused Terminals (6-pin only)**

Terminal 3 is connected to the internal circuit. Do not connect anything to terminal 3 externally.

**Pin Strength for Automatic Mounting**

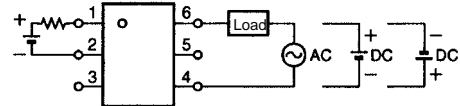
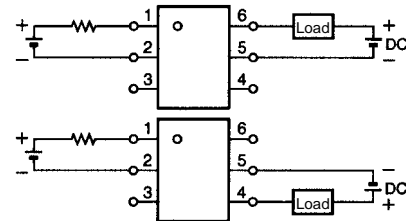
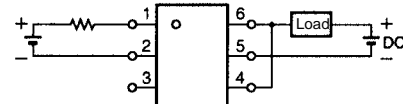
In order to maintain the characteristics of the relay, the force imposed on any pin of the relay for automatic mounting must not exceed the following.



In direction A: 1.96 N  
In direction B: 1.96 N

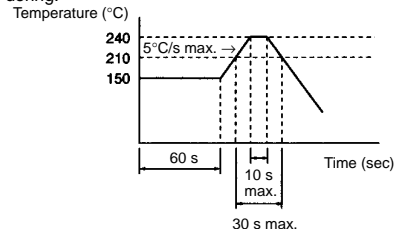
**Load Connection**

Do not short-circuit the input and output terminals while the relay is operating or the relay may malfunction.

**AC Connection****DC Single Connection****DC Parallel Connection****Solder Mounting**

Maintain the following conditions during manual or reflow soldering of the relays in order to prevent the temperature of the relays from rising.

1. Pin Soldering  
Solder each pin at a maximum temperature of 260°C within 10 s.
2. Reflow Soldering
  - a. Solder each pin at a maximum temperature of 260°C within 10 s.
  - b. Make sure that the ambient temperature on the surface of the resin casing is 240°C max. for 10 s maximum.
  - c. The following temperature changes are recommendable for soldering.



**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. K112-E1-1    **In the interest of product improvement, specifications are subject to change without notice.**

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